DOCUMENT RESUME

ED 377 460 CS 011 926

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TITLE Reciprocal Processes in School Subjects and Literacy Learning: A Discussion.
PUB DATE [95]
NOTE 22p.
PUB TYPE Viewpoints (Opinion/Position Papers, Essays, etc.) (120)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Content Area Reading; Cooperation; Elementary Education; *Integrated Activities; *Interdisciplinary Approach; Mathematics Instruction; Science Instruction; *Teaching Methods
IDENTIFIERS *Educational Issues

ABSTRACT

The recent interest of a number of educators in the reciprocal processes in the various school subjects and literacy (in the hope of achieving better teaching and more student involvement, interest, and enjoyment) is worthy of the careful consideration of all educators. All teachers involved in merging school subjects into a unit of study must be actively and seriously engaged in the merging if it is to be successful. A gradual approach should be taken so that teachers do not feel that the merging was being forced on them. An article by C. P. Casteel and B. A. Isom offers a framework designed to deepen student learning and promote stronger curriculum ties, discussing teaching scientific concepts through literacy-based activities. Experience has taught that gaining teachers' cooperation might not be easy. Unresolved issues also exist in reading in the mathematics classroom. Technology does have much to offer but not if programs involving it are designed without consideration of the uniqueness of all the students concerned and adequate preparation of the teachers before the programs are implemented. Several publications of the International Reading Association might be of interest to teachers interested in merging social studies or science and literacy. Librarians can help and should be consulted in connection with contributing to the various programs. To realize the possibilities of the successful merging of school subjects and literacy, much thinking needs to be done and cooperation among all concerned needs to be achieved. (Contains nine references.) (RS)

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Susan Partridge

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Susan Partridge

Reciprocal Processes in School Subjects and Literacy Learning: A Discussion

The recent interest of a number of educators in the reciprocal processes in the various school subjects and literacy, in the hope of achieving better teaching, more student involvement, interest and enjoyment, is felt worthy of the careful consideration of ALL educators. The emphasis on reciprocal processes should avoid the disasters, in past years, of several, personally-witnessed attempts involving the integration of subjects. An example follows:

History and geography were to be known as social studies. Good teachers had been merging history and geography for years and had made use of other subjects as well. For example, in studying about the Alamo, they used maps to show the location of Texas, and math to help students understand distance. This was enlightening to the children, especially to the young fifth grade student whose home and school were in the northern part of our country and a little less than two miles from the school, which meant that he was not afforded transportation and had to walk to and from school each day. He knew of a Texas Road not far from his home. His efficient and caring fifth grade teacher made sure that the Texas concerned was far away. Her math strategy helped all students understand the concept of distance. She used the scale of miles on a large map and

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explained that San Antonio, home of the Alamo, was about 1820 miles from the school. The interest and excitement of the various children in hearing the figure was expressed thus: "Wow! That's far!;" "I could NEVER walk that far!;" "Me neither!;" "Me neither!;" "NONE of us could!" There were still other expressions by other equally-excited children.

She went on to explain that, time-wise, the distance could be shortened by using cars, trains or planes. This began a lively discussion in which the children participated.

The children's response to her use of math in the history lesson must have been very rewarding to the teacher and well worth her effort in merging the two, for, in so doing, she had linked the children's "little world" in which they lived with the great "outside world." This is felt to be important, because, as they come into adulthood, many will become, more and more, a part of the huge "outside world," and must understand it.

The popularity of units is remembered too. Any subject - music, physical education, art - could be brought into a unit though the unit dealt with another area - history, for example. "Dragged in" might have been more appropriate. The music supervisor complained that songs she was asked to introduce bore no relevancy whatever to the unit concerned.

Perhaps they had one or two words of similar sound to one or two in the unit. She said, rather angrily, "Music can stand on its own two feet and does not need to be 'dragged in by the hair of its head' to a place where it obviously isn't relevant." This was, indeed, unfortunate, for there are many songs which would be appropriate in history units. Music can be a powerful medium, as it is generally enjoyed by all students. From observing the work of caring and conscientious teachers through many decades, it is truly believed that the merging of school subjects and literacy learning has many merits and should be given careful consideration. It can promote literacy, can arouse interest, can actively involve more students, can increase enjoyment and knowledge gained, strengthen curriculum ties and link schools with the outside world.

The problem is that ALL teachers must be actively and seriously engaged in the merging if it is to be successful. It is remembered that teachers were often "thrown" into programs in which they had no part in designing and received little, if any, in-service help in carrying out the programs. Needless to say, many of the programs failed.

Another problem which must be solved in the merging is attitude. There are those teachers who are "subject bound" and do a good job of teaching THEIR subject. Effort must be made to convince them of the many benefits to students and

of the making of their own teaching much more rewarding if they would consider merging. It is felt that a gradual approach rather than a hurried one in which teachers might feel that merging was being "crammed down their throats" would prove more successful.

A few examples of merging are offered: some children are fond of music; some of dancing; some of history; some of physical education; some of English; and some of science. Each has a favorite. For the child who loves music, a relevant song introduced in a particular study can promote literacy and add to enjoyment. Some like art. Appropriate pictures would add to their understanding and enjoyment. Still others like dancing which can add to children's understanding, pleasure and profit.

It is recalled that during the Great Depression, an elderly black gentleman and a young Jewish woman came to schools in a rural area as part of a government-sponsored work program. The elderly gentleman played the piano very well, and the young woman taught the children the dances - Scottish, Irish, etc. The children were delighted and would practice faithfully to show the teacher, upon her next visit, how well they remembered each dance. The piano player deserved a lot of credit for his encouragement. If the children hesitated as they danced, he always slowed down

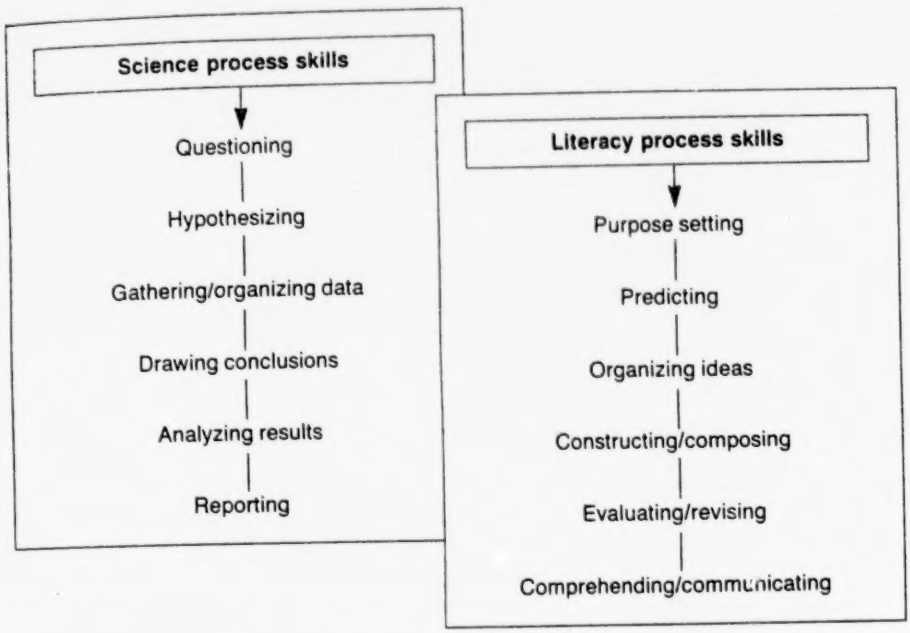
his music and thus made the hesitation go virtually unnoticed.

The cooperation of the physical education teachers could provide this meaningful activity, when relevant, to a particular country being studied. This might be more welcome, enjoyable and more meaningful in our increasing, multi-ethnic society but not without cooperation between the classroom teachers concerned and the physical education teachers.

An article, "Reciprocal Processes in Science and Literacy Learning," by Carolyn P. Casteel and Bess A. Isom (2), offers a framework "designed to deepen student learning in both areas and promote stronger curriculum ties." They state the goal thus: "The goal is to teach scientific concepts through literacy-based activities by using trade books of different genres and on varying levels and through cooperative and individual writing activities, as well as by using science texts, resources, and manipulatives."

The authors believe that the processes of science and literature have many common elements, and offer understandable graphics supporting their belief. The graphics follow:

Figure 2
A comparison of science and literacy process skills



Reciprocal processes in science

Science activities	Literacy-based activities
Questioning Ask questions about conditions leading to different types of weather. Example: What is weather? What conditions contribute to changes in the weather?	**Purpose setting** Set purposes for reading a trade book about weather by having students write information they hope to find in response journals. Read to find out what conditions contribute to weather changes.
Hypothesizing Form hypotheses about what will happen when air temperatures and pressures change. Example: Conditions of the air contribute to changes in weather. Temperature contributes to rain, sleet, snow, and hail conditions.	**Predicting** Predict how weather conditions might influence plot and affect characters, setting, and mood in various stories.
Gathering/organizing data Record and categorize daily pressure/temperature changes and weather conditions. Also, record results of experiments on air temperature such as making a hygrometer to measure moisture. Participate in computer simulations of weather experiments. Research methods for collecting weather data such as the use of weather balloons.	**Organizing ideas** Create cognitive maps to organize information learned from reading trade books about weather. Also, complete word webs or semantic feature analyses relating to technical vocabulary words.
Analyzing results Analyze all collected data and identify factors that affected results. Use charts, tables, and diagrams to illustrate analysis.	**Constructing/composing** Discuss personal experiences relating to different types of weather conditions and participate in language-experience activities to write comparisons between weather conditions and effects on human behavior.
Drawing conclusions Meet in cooperative groups to review data and draw conclusions relative to the hypotheses.	**Evaluating/revising** Make judgments about and edit written compositions about weather. Example: Evaluate accuracy of facts, clarity of ideas, and use of mechanics in writing.
Reporting Prepare a written report summarizing information learned. Make oral presentations to another class.	**Comprehending/communicating** Publish a classroom book about weather. Share individual entries through the use of the author's chair.

Decades of educational experience are convincing that the work of Casteel and Isom is a valuable asset to those interested in raising literacy rates, making science and literature more enjoyable to students and capturing the interest of more students, just to mention a few. However, cooperation between science and English teachers would be needed for success of the endeavor.

Experience has taught that gaining such cooperation might not be easy. Throughout the decades she has heard science teachers say that they weren't concerned with punctuation, spelling and correct usage. They were concerned that their students understood the science concepts they were teaching them. Let the English teachers take care of the "mechanics" seemed to be the opinion of other subject matter teachers as well. This is contrary to the belief of Casteel and Isom who write: "The acquisition of process skills in science is also fostered by writing (Santa and Havens, 1991). Creative writing, journal writing, and scientific writing can each offer opportunities for students to evoke prior knowledge, organize information, and become more actively involved in learning science while honing literacy skills."

It is encouraging to note that integrated science and literacy programs have been reported in reputable educational periodicals for years. One that comes readily

to mind appeared in the Nov./Dec. 1990 issue of Teacher. The article, "It's Not Just Shop Class Anymore" was written by D. Gursky (5) who explained the program in the Pittsburgh, Pa. Schools thus: "The students in regular English classes write themes about electronics as well as traditional themes. The students assigned to Al Puckaric, an electronics teacher, get three grades on every electronics assignment - one for their mastery of electronic concepts, one from an English teacher on the quality of their writing, and one from a business teacher on their command of computer and word processing skills."

Jeanne Shay Shumm and Linda Saumell (8) reported on some unresolved issues in reading in the mathematics classroom. They reported that a survey by Diane Muth in which middle school teachers participated indicated that reading comprehension (more so than computation or decoding) inhibited students' ability to complete word problems and that teachers did not feel that they were equipped with instructional strategies to assist students in this area.

The seemingly, never-ending wonders of technology, many of which are being used in our schools require academics - high level math and science. It is believed that teaching toward this requirement can begin down in the grades if it is commensurate with the age levels and abilities of the students concerned.

Susan Bayley's (1) response, in the October 1994 issue of Teacher, to a letter by researchers, Sharon Griffin and Robbie Case, which had appeared in the August 1994 issue, is an acknowledgment of their contributions but also makes a plea for the language of math. The letter follows:

> I was pleased to see the connection made between economic background and mathematical learning in "Counting Them In." [Aug.] But I believe that researchers Sharon Griffin and Robbie Case need to be aware of yet another factor in mathematics education: language.
>
> Although we traditionally view mathematics as involving only numbers, this subject area has a very high language content. Students will not be able to understand numerical value, addition, subtraction, etc., if they cannot understand the language in which the concepts are presented. Thus limited-English proficient students - particularly those from immigrant or refugee families - face an especially challenging task when it come to learning basic math.
>
> More and more ESL teachers are relying on content-based math instruction. Using this approach, teachers instruct students in the unique language of mathematics, increasing both their quantitative and verbal abilities. Not only do students understand numerical concepts better, they also gain a broader knowledge of English.

It is felt that today's English language teachers face increasing competition from the outside world. An example follows:

In the July 4, 1994 issue of Time, Philip Elmer-Dewitt asks, in his article, "Technology: Would Shakespeare have sent E-Mail?", this question: "If E-mail represents the renaissance of prose, why is so much of it so awful?" He then goes on to discuss the question at considerable length. He describes much of it as "sloppy, meandering, puerile, ungrammatical, poorly spelled, badly structured and, at times, virtually content free." He offers what he considers an all too typical message on the Internet: "Hey!!!1, I THINK METALLICA IS REEL KOOL, DOOD!!!"

In the last paragraph of his article, he states: "But it would be a mistake to dismiss the computer-message boards or to underestimate the effect a lifetime of dashing off E-mail will have on a generation of young writers. The computer networks may not be Brook Farm or the Globe Theatre, but they do represent, for millions of people, a living, breathing life of letters. One suspects that the Bard, himself, confronted with the Internet, might have dived right in and never logged off."

Below this statement, he offered this Glossary which might be of interest to readers of his article.

GLOSSARY

Acronyms

LOL *Laughing Out Loud!*
ROTFL *Rolling on the Floor Laughing*
IMO *In My Opinion*
IMHO *In My Humble Opinion*
MOTOS *Member of the Opposite Sex*
MOTSS *Member of the Same Sex*
FAQ *Frequently Asked Question*
RTFM *Read the [Expletive] Manual!*

Emoticons

:-) *This is to let you know I'm smiling (turn your head sideways to read it)*
;-) *I'm winking*
:-(*I'm frowning*
:-D *I'm laughing*
:-X *My lips are sealed*
@:-) *I'm wearing a turban*
(:-) *I'm wearing a toupee*
=:-I *I'm a cyberpunk*

The goal, as stated by Casteel and Isom, in merging subjects and literacy can contribute to the academics required for the effective use of technology, as it offers many different activities which should provide for individual preferences and needs.

Experience has been convincing that technology should not be used as an "easy-out." A random sampling of students at a prestigious university is offered: The students were asked, What do you think of the word processor? The question had hardly been asked when a graduate student exclaimed, "I love it! I never could spell."

Another survey was made of adults who were learning to read and/or to improve their reading skills for job promotions, social reasons, etc. Computers were used in the program in which they were enrolled. A young man expressed his liking for computer use because, as he put it, "I'd much rather tell all my friends that I go to computer class

rather than to a reading class." It is felt that "saving face" can be helpful in certain situations but it, as welfare, should not be used as a way of life.

Teachers should not be plunged into the use of technology without adequate training. A number of teachers have been heard to say that they are concerned because they know so little about technology. Without adequate training, failure is inevitable. Too, there are teachers who have a strong leaning toward books and, certainly, books do have a place in our schools. The uniqueness of teachers as well as the uniqueness of children should be considered if the best interests of all concerned are to be served.

Tom Snyder (9), founder of an educational software company, and also a former teacher, was a guest speaker at the 1994 International Reading Association Convention. Snyder had this to say about computers:

"Computers in education tend to diminish the teacher's role in the same way they have revitalized what he called student-centered, 'teacher-out-of-the-loop' teaching. Interactive hyper media, nonlinear fiction in which the reader chooses which plot elements will happen next, the ability to jump around in a text, rather than going from the beginning through the middle to the end - all this makes the learner the center of the educational universe."

Snyder acknowledged that there are important roles for computers to play in education, but warned that we must not surrender all of the "blood and guts" of all the great things that happen in the classroom. He encouraged educators to "be the vanguard that keeps great stories alive."

It is agreed that technology does have much to offer but not if programs involving it are designed without consideration of the uniqueness of all the students concerned and adequate preparation of the teachers before the programs are implemented.

When studying a particular country, contacts with that country, made possible through technology, should enrich a program merging history and literature and make teaching more rewarding and exciting.

Fortunately, there are numerous helps for understanding the merging of various school subjects and literacy. Just recently, a notice received from the International Reading Association (IRA), contained several helpful things they have available. An explanation of one, "Fact and Fiction: Literature Across the Curriculum," edited by Cullinan, B.E. (4) follows:

> This volume discusses how to use trade books across the curriculum in innovative ways: historical fiction, books from and about other cultures, and non-fiction on a range of topics can

> enliven social studies units; favorite books have great potential for teaching common mathematical concepts such as time classification, and money; and there is a wealth of literature available on topics such as animals, weather, and astronomy to complement instruction with science textbooks.

Another book, listed in IRA's notice, which might be of interest to teachers interested in merging social studies and literature is Children's Literature and Social Studies. The introductory statement in the notice reads: "This practical collection of information and literature-based teaching ideas shows how to make social studies a vibrant, challenging, and exciting subject for both teachers and students."

Still another which might be of interest to teachers interested in merging science and reading is Science Learning: Processes and Applications. The introductory statement in the notice reads: "Science and reading teachers join hands to address a common problem: science concepts and texts are difficult for most students to comprehend."

There is a felt need to say that no matter how great the teaching of those teachers involved in merging subjects and literacy, there are outside deterrents to their success with some students. One of these deterrents involves the community. A recent flyer received from the Jossey-Bass

Publishers in San Francisco, California, described Building Community in Schools, by Thomas J. Sergiovanni (6) thus: "Explains why a sense of community is so vital to the success of any school, and he shows teachers, parents, and administrators what they can do to rebuild it."

Of Sergiovanni, Michael Fullan, Dean of Education, University of Toronto, has this to say, "Sergiovanni is the leading writer in pushing us deeper and toward understanding and creating a community of learners."

Albert J. Shanker (7), President, American Federation of Teachers, seems to have great insight into school problems. He discusses other deterrents which keep highly capable teachers from doing the "job" they are capable of doing. He raises the question, "Does the fact that a student didn't learn something prove it wasn't taught or taught adequately?"

Merging of subject matter and literacy is thought to be in the best interest of both students and teachers, but it must be understood that, for its success there must be greater cooperation between the schools and the teacher-training institutions, between parents and teachers, administrators and teachers, in-service help for teachers, etc.

Continuous and adequate help for teachers is considered most important, for a lesson well-taught might not be

learned because the particular learning style of that child was not used. When the teacher receives help in dealing with this problem, both she/he and the child concerned profit as will other such cases in the future.

Schools are faced with other deterrents as well, one of which is high student mobility which takes its toll on both teaching and learning. An article, "Here Today, Gone Tomorrow," by Deborah L. Cohen (3) deals with this problem.

Conclusions

It is concluded that the successful merging of school subjects and literacy has many possibilities: actively involving more students, making learning easier and more enjoyable for the various ethnic groups and for those students for whom learning does not come easily, providing curriculum ties, increasing the literacy rate, and making teaching more rewarding and exciting.

It is further concluded that to realize these possibilities, much needs to be done before "launching the merging": much thinking, much cooperation among all concerned, greater empowerment of teachers and a gradual and comfortable approach, among them.

Implications

1. In the best interests of both students and teachers, much thought and cooperation among all concerned, should be given to the merging of school subjects and literacy.

2. In designing programs, an emphasis on reciprocal processes in the various school subjects and literacy should be considered.

3. The approach to designing and implementing programs should be gradual.

4. Greater empowerment of teachers is needed, as they know children.

5. The uniqueness of all children should be the guiding force in designing programs for them.

6. Books, as well as technology, definitely have a place in the programs.

7. Librarians can be of great help and should be consulted in connection with contributing to the various programs.

8. The financing of the programs must be considered.

9. Teachers should do what they can to minimize outside deterrents.

10. A good motto for undertaking the merging of the various school subjects and literacy might be, "Literacy is Everybody's Responsibility."

11. Teachers should exercise their voting rights to help elect politicians who are truly interested in education.

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